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REMARKS

Favorable reconsideration of this application is requested in view of the following remarks and the Rule 1.132 Declaration by Noboru Taniguichi submitted herewith. Applicants appreciate the courtesy shown by the Examiner in discussing this case with Applicants' representative on September 24, 2007. The discussions of the interview are reflected in the following remarks.

Claims 1 and 3 have been amended. Claim 1 has been clarified to confirm that elemental aluminum and aluminum oxide are present in the at least one electrode, and is supported for example by Example 1 and page 11, line 10 to page 12, line 1. The limitation in claim 3 concerning X being at least 0.62 and at most 0.88 is supported for example by Example 1 and Table 1 (Nos. 1-14) on page 11. Claims 15 and 16 are new, and are supported by for example page 3, lines 26-29 and lines 31-34. Claims 1, 3 and 14-16 are pending in the application. No new matter has been added.

Claim rejections - 35 U.S.C. § 112

Claims 1 and 3 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Claims 1 and 3 have been amended, taking the issues in the rejection into account. Applicants do not concede the correctness of the rejection.

Withdrawal of the rejection is respectfully requested.

Claim rejections - 35 U.S.C. § 103

Claims 1, 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1 041 380 A2 (EP '380). Applicants respectfully traverse this rejection.

Claim 1 requires "a" and "b" to satisfy the relationship: $a + 2b \leq 7$, where a content of elemental Al in the at least one electrode is "a" mol%, and a content of aluminum oxide in the at

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least one electrode is "b" mol%. As shown in Table 1, it was found that when a hydrocarbon sensor contains elemental Al and aluminum oxide in amounts as required by claim 1, the sensor is unlikely to be influenced by the heat cycle and has higher reliability (page 11, lines 10-13; see for example Nos. 4-8). The rejection contends that it would have been obvious to one of ordinary skill in the art to have optimized the recognized result effective variable as taught by EP '380. Applicants respectfully disagree and submit a second Rule §1.132 Declaration by Mr. Noboru Taniguchi to show that EP '380 fails to teach or suggest a highly reliable hydrocarbon sensor having at least one electrode that satisfies $a + 2b \leq 7$ as required by claim 1. In particular, the Declaration provides experimental data showing the amounts of Al in Embodiments 1 to 3, which correspond to Figures 3, 4 and 8, respectively, of EP '380.

Briefly, experiments were carried out as described in the embodiments of EP '380. The following samples, which correspond exactly to those described in the reference, were produced: (A) a composition having a layer formed from an Au film and an Al film covering the Au film and fired, resulting in an alloyed layer depicted by the X-ray diffraction in Figure 3 of EP '380 (Embodiment 1, paragraphs [0049~0057] of EP '380); (B) a composition having a layer formed from an Au paste mixed with an Al paste in a volume of equal ratio and fired, resulting in an alloyed layer depicted by the X-ray diffraction in Figure 4 of EP '380 (Embodiment 2, paragraphs [0058~0062] of EP '380); and (C) a composition having a layer formed from an Au paste mixed with Al paste in a volume of 1:2 and fired, resulting in an alloyed layer depicted by the X-ray diffraction in Figure 8 of EP '380 (Embodiment 3, paragraphs [0063~0068] of EP '380). The composition ratios of $\text{AuAl}_2/\text{Au}/\text{Al}(\text{Al}+\text{Al}_2\text{O}_3)/\text{Au}_n\text{Al}_m$ and AuAl_2/Au were then calculated for the above samples using analytic values of the X-ray diffraction data shown in

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Figures 3, 4 and 8 of EP '380 (the experimental data obtained from previous experiments corresponded substantially to the results obtained by the abovementioned experiments). The results are summarized in the following table.

	AuAl ₂ / Au / Al(Al+Al ₂ O ₃) / Au _n Al _m					AuAl ₂ / Au		
A	32	/	4	/	52(46+6)	/	12	89 / 11
B	48	/	14	/	36(31+5)	/	2	77 / 23
C	36	/	17	/	30(26+4)	/	17	68 / 32

As shown in the table above, EP '380 fails to disclose anywhere near the amounts of elemental aluminum and aluminum oxide that satisfy the relation $a + 2b \leq 7$ as required by claim 1. In fact, EP '380 teaches four to seven times more than the claimed amounts of Al. On the other hand, as shown in Table 1 of the specification, when the content of Al is present even in amounts just above 7 mol%, the change in current output before and after the heat cycle becomes more than the acceptable range. Although EP '380 teaches the presence of alumina, nothing in the reference teaches or suggests limiting the amounts of elemental aluminum and aluminum oxide to satisfy the relation $a + 2b \leq 7$ so as to reduce the degradation in characteristics caused by heat. Therefore, claim 1 and the dependent claims are patentable over EP '380 for at least these reasons.

Claim 3 is even further removed from the reference. Claim 3 limits the amounts of AuAl₂ and elemental Au. Nothing in the reference suggests that the presence of these components in amounts as required by claim 1 would provide benefit to the reference's indicated purpose of reducing the degradation of hydrocarbon detection ability in the presence of high oxygen concentrations. Therefore, the reference fails to suggest the invention of claim 3.

Double Patenting

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Claims 1, 3 and 14 are rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claim 1 of US Patent No. 6,638,406 in view of EP '380. Applicants respectfully traverse this rejection.

The rejection uses EP '380 for reasons similar to the rejection under 35 U.S.C. 103, and therefore, US Patent No. 6,638,406 and EP '380 are removed for at least the same reasons discussed above.

Favorable reconsideration and withdrawal of the rejection are respectfully requested.

In view of the above, favorable reconsideration in the form of a Notice of allowance is requested. If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, Douglas P. Mueller (Reg. No. 30,300), at (612) 455.3804.

Respectfully Submitted,

Dated: 11-5-07



CBH/DPM/ym

A handwritten signature in cursive script, reading 'Curtis B. Hamre'.

Curtis B. Hamre
Reg. No.: 29,165
Hamre, Schumann, Mueller & Larson, P.C.
225 South Sixth Street
Suite 2650
Minneapolis, MN 55402
612.455.3800